Inoculants - Improving Silage Fermentation

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Background

- Ensiling is a way of preserving a moist crop.
- Crops are preserved in the silo by:
  1) Keeping out oxygen and
  2) A low pH created by lactic acid bacteria fermenting sugars to lactic acid and other compounds
- This process is similar to making pickles, sauerkraut and yogurt.

What Are Silage Inoculants?

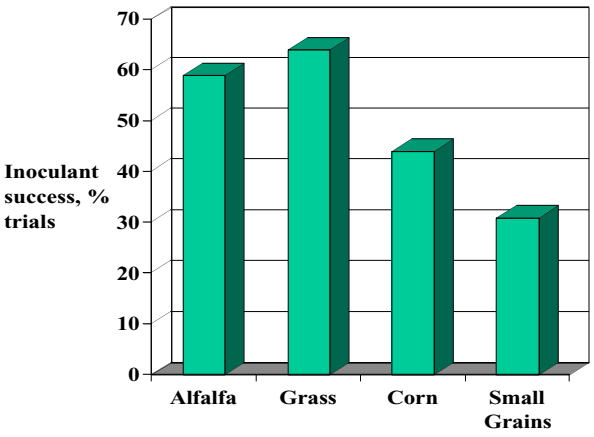
- Lactic acid bacteria to supplement those already on the crop.
- Inoculants are selected natural strains from crops and silages that:
  1) Grow rapidly
  2) Grow under a wide ranges of temperatures, moisture contents
  3) Produce mostly lactic acid
- Typical genuses: *Lactobacillus, Pediococcus, Enterococcus*

What Are The Benefits?

- Fast, efficient fermentation leading to:
  1) A lower pH
  2) Higher lactic acid concentration
  3) Lower concentrations of other fermentation products
- Lower storage losses (2-3%)
- Improved animal performance; on average:
  1) 3 lbs. milk/cow/day
  2) 2 to 5% better gain in growing cattle

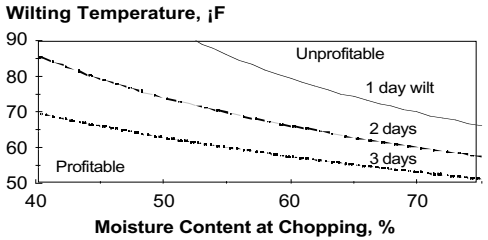
Do Inoculants Always Work?

- No, primarily because of competition from bacteria already on the crop!
- Inoculants work more often in alfalfa and grass silages than in corn and small grain silages.
- Work best when natural population on the crop is low, but there are no quick ways to measure the bacteria on the crop.



When Should Inoculants Be Used?

- In alfalfa, we have found that the natural bacterial population is related to harvesting conditions. This has allowed us to develop graphs to predict when inoculants will be profitable.



- If farmers always use inoculants on alfalfa silages, return on investment is 1:1 to 1.5:1.
- Using the graphs boosts returns to 2:1 to 3:1.
- Currently we do not recommend using inoculants on corn and small grain silages, but improved inoculants are coming on the market that appear to work more frequently on these crops and make more stable silages.

Summary

- Inoculants help guarantee a rapid and efficient fermentation in the silo.
- When they work, farmers will see reduced storage losses and improved animal performance.
- In alfalfa, we have determined when inoculants are more likely to be successful so that farmers can use them more profitably.